

**What is claimed is:**

- 1     1. A surgical instrument holder (10) comprising:  
2         (a) a head assembly (68) having a shank (12) with a first driveable end (14) and second  
3         coupling end (16), the second end comprising a coupling device (20) having an interface (22 ) for  
4         receiving a surgical instrument (24) and held in functional assembly to the shank by a releasable  
5         locking mechanism (26) comprised of a ring (30) slideably disposed about the shank, a spring  
6         (32) biased against the coupling device (20) by the ring, and a connection device (34) retaining  
7         the ring in a fixed position during use; and  
8         (b) a drive spindle assembly (42), connected to the head assembly (68) so as to transmit  
9         torque therethrough, the spindle assembly comprising an elongated drive spindle (40), high-  
10        precision bearings (44, 120, 122) and a cylindrical tube (46), wherein the drive spindle (40) is  
11        releasably mounted to an end (36) of the spindle assembly and is supported for rotation within the  
12        cylindrical tube (46) by the high-precision bearings disposed therebetween and held in place at  
13        least in part by the shank (12), the bearings (44) precisely controlling the position of a surgical  
14        instrument (24) affixed thereto;  
15        wherein further, the connection device (34) provides a common quick-release connection  
16        with the head assembly and the drive spindle assembly (42), whereupon unlocking of the  
17        connection device (34) enables quick disassembly of the connection device, spring (32), ring (30),  
18        and drive spindle assembly (42) for cleaning and component sterilization.
- 1     2. The surgical instrument holder (10) of claim 1, wherein the ring (30) of the releasable locking  
2     mechanism (26) is moveable in a locking direction to lock the instrument (24) onto the interface  
3     (22).
- 1     3. The surgical instrument holder (10) of claim 1, wherein the connection device (34) comprises  
2     at least one pin (54) mounted in a coupling sleeve (56) against which the spring (32) is biased by  
3     the ring (30), the sleeve being slideable about the shank (12) so as to operate a ball-detent (60).
- 1     4. The surgical instrument holder of claim (10), wherein a handle (62) is attached to the first end  
2     of the elongated spindle assembly (42).
- 1     5. The surgical instrument holder (10) of claim 1, wherein the spindle (40) is held within a  
2     spindle tube (46) by precision ball bearings (44, 120, 122) which provide precision rotation of the  
3     spindle with the tube, and wherein the tube (46) is provided with position sensors (125), placed at

- 4 pre-determined locations (124) on the tube, thereby enabling the instrument holder (10) to  
5 participate in the communication of position information.
- 1 6. The surgical instrument holder (10) of claim 1, wherein the interface (22) is a recess (22) in the  
2 coupling end (16) of the shank (12).
- 1 7. The surgical instrument holder (10) of claim 6, wherein the recess (22) is cylindrical and  
2 coaxial with a central axis (64) of the shank (12).
- 1 8. The surgical instrument holder (10) of claim 7, wherein a chamfered surface (66) is disposed  
2 within the recess (22) to align the instrument (24) axially.
- 1 9. The surgical instrument holder (10) of claim 1, wherein the spring (32) is a helical  
2 compression spring.
- 1 10. The surgical instrument holder (10) of claim 2, wherein the locking device (30) is disposed in  
2 the coupling end (16) of the shank (12).
- 1 11. The surgical instrument holder (10) of claim 2, wherein the connection device (34) activates  
2 at least one ball-detent (60).
- 1 12. The surgical instrument holder (10) of claim 11, wherein the connection device (34) activates  
2 at least two circumferentially spaced apart ball-detents (60).
- 1 13. The surgical instrument holder (10) of claim 2, wherein the locking direction is toward the  
2 coupling end (16) of the shank (12).
- 1 14. The surgical instrument holder (10) of claim 1, wherein the connection device (34)  
2 cooperates with a bayonet slot (94) to lock the device on the shank (12).
- 1 15. The surgical instrument holder (10) of claim 14, wherein the pin (54) of the connection  
2 device (34) locks in the bayonet slot (94).
- 1 16. The surgical instrument holder (10) of the claim 15, wherein the bayonet slot (94) is disposed  
2 on the shank (12).
- 1 17. The surgical instrument holder (10) of claim 11, wherein the ball-detent (60) comprises a ball  
2 (106) received into an annular recess (110) in the instrument holder, the locking component (34)  
3 sliding over the ball detent (60) to bias a ball (106) into the recess (110) to lock the shank (12)  
4 onto the drive spindle (36) in a manner to lock the cover assembly (45) including the bearings  
5 (122) in place.
- 1 18. The surgical instrument holder (10) of claim 1, wherein the interface (22) is a recess  
2 intersected by a transverse slot (76) in which a wall (80) of the slot engages a corresponding  
3 surface (82) of the instrument (24).
- 1 19. The surgical instrument holder (10) of claim 18, wherein the recess (22) includes a seat (84)  
2 shaped to receive the end of the instrument (24) about its circumference (86).

20. The surgical instrument holder (10) of claim 1, wherein the shank (12) is hollow along its length so as to provide a channel (90) facilitating chip removal.

21. The surgical instrument holder (10) of claim 1, wherein the tube (46) includes position sensors (124) mounted on the spindle (40) which participate in the communication of position information to a computer to aid in computer assisted surgery.

22. The surgical instrument holder (10) of claim 1, wherein a frustoconical widened part (100) provides a grip for the thumb and index finger for pulling the locking component (30) back counter to the action of the spring (32) in order to release the instrument (24) fixed on the instrument holder.

23. The surgical instrument holder (10) of claim 1, wherein, the spindle assembly (42) is disconnectable from the head assembly (68) by means of the common connection device (34) when a user holds the device (34) having an internal stud (54) against a bias of the spring (32), then turns the ring (34) in such a way that its stud (54) leaves a bayonet catch (94) so as to unlock the ring from the catch, the user being able to remove the ring (34) from the shank (12), and then the spring (32), followed by the locking component (30) as well.